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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/509,909	04/07/2005	Uwe Keyser	03100214AA	4258

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EXAMINER	
MONDT, JOHANNES P	

ART UNIT	PAPER NUMBER
3663	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/509,909	KEYSER ET AL.	
	Examiner	Art Unit	
	Johannes P. Mondt	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 September 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) *6-13* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 14-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Amendment filed 9/4/07 forms the basis for this office action. In said Amendment applicant substantially amended at least all previously elected claims and added new claims 14-18.

Comments on Remarks submitted with said Amendment are included below under "Response to Arguments".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. ***Claims 1-5 and 14-18*** are rejected under 35 U.S.C. 103(a) as being unpatentable over Grenier et al (5,373,538) (see IDS and the above comments under Information Disclosure Statement) in view of Miley et al (Applied Radiation and Isotopes Volume 53, pp. 779-783 (2000).

On claim 1: Grenier et al teach a method for the non-destructive chemical analysis of test objects by means **4** of irradiating the test object with neutrons (neutron irradiation means 4; see abstract and col. 8, l. 41-46) and measuring the amount of gamma photon radiation emitted (by means of high resolution gamma detectors **14**; see col. 8, l. 59-63) promptly by the test object during the irradiation from the number of gamma photon

quanta and respective photon energy in order to record a photon energy spectrum, characterized by

- determining characteristic photon energies from the amounts of gamma photon radiation from the entire photon energy spectrum which exceed background photon radiation, up to and including a photon energy of 12 MeV is concerned (col. 1, l. 33-43), and
- determining the elements or isotopes of the test object by assigning the characteristic photon energies distributed over the entire photon energy spectrum to corresponding elements and/or isotopes which are in each case stored unambiguously in relation to a photon energy (by processing means including electronic processing means **18/20/22/24** and computer **26**; see col. 9, l. .13 – col. 10, l. 7).

Grenier et al do not necessarily teach the limitation that said neutrons are generated from target-free fusion of concentrically accelerated deuterium ions. (Examiner note: although Grenier et al "prefer" 14 MeV neutrons, corresponding to the neutron energy from D-T fusion, said preference falls short of a teaching away from other fusion reaction produced neutrons, of which the easiest to achieve is the D-D fusion produced neutrons: a preferred embodiment does not constitute a teaching away (see MPEP 2123), section II).

However, it would have been obvious to include said limitation in view of Miley et al, who, in a patent on *inter alia* a D-D beam based fusion neutron source (see page 780, second column, second paragraph), hence analogous art, teaches a neutron

source in the form of a concentric pair of electrodes (cathode and anode), wherein D-D reactions occur after concentric acceleration of deuterium ions, colliding in the center (see Figure 3 and page 780) (see abstract and col. 12, l. 15-33; and Figure 1).

Motivation to include the teaching by Miley et al into the invention by Grenier et al derives from the possibility to focus on fusion reaction produced neutron without the need for expensive management of a tritium inventory unlike D-T based production, nor the need for a solid target. The focus on D-D reaction based neutron production clearly stands out as one of very few alternatives to D-T reaction based neutron production for those of ordinary skill in the art, especially in light of the thresholds for fusion reactions as a function of ionic charge (the Coulomb barrier has to be overcome).

The claim would have been obvious because a person of ordinary skill in the art has good reason to pursue the known options within his or her technical grasp; if this leads to the anticipated success, it is likely the result not of innovation but of ordinary skill and common sense.

On claim 2: the method by Grenier et al is further characterized by a quantitative determination of the chemical element composition of the test object by measuring the photon energy spectrum and determining the properties of the elements or isotopes determined by relating the amount of gamma photon radiation per element or isotope to the entire amount of photon radiation determined for all characteristic photon energies determined (col. 1, l. 56 – col. 2, l. 66; col. 9, l. 61- col. 10, l. 22 and col. 11, l. 54- col. 12, l. 34).

On claim 3: the amount of gamma radiation is, in the method by Grenier et al, obtained from the gamma radiation as measured (loc.cit.), which inherently determines the integrated accumulations, i.e., the areas of the characteristic curves in the regions of the characteristic photon energies, because any instrument counts an event not based on absolute certainty of wavelength but based on being in a bin defined by lower and upper limit.

On claim 4: the method is further characterized by recording a base photon energy spectrum of the test chamber without the test object and čalculating a photon energy spectrum used for determining the elements or isotopes as claimed, as what is commonly known and trivially included in any serious measuring technique (to which examiner takes official notice) as a benchmark or null experiment (see col. 12, l. 3-11).

On claim 5: the method by Grenier et al is further characterized by comprising irradiating sections of the test object from a plurality of directions and evaluating the plurality of measurement results (col. 8, l. 47 – col. 9, l. 2: because measurements are taken during an extended period of time during which the test item travels on a conveyor belt).

Grenier et al teach a method for the non-destructive chemical analysis of test objects by means **4** of irradiating the test object with neutrons (neutron irradiation means 4; see abstract and col. 8, l. 41-46) and measuring the amount of gamma photon radiation emitted (by means of high resolution gamma detectors **14**; see col. 8, l. 59-63) promptly by the test object during the irradiation from the number of gamma photon quanta and respective photon energy in order to record a photon energy spectrum, characterized by

- determining characteristic photon energies from the amounts of gamma photon radiation from the entire photon energy spectrum which exceed background photon radiation, up to and including a photon energy of 12 MeV is concerned (col. 1, l. 33-43), and
- determining the elements or isotopes of the test object by assigning the characteristic photon energies distributed over the entire photon energy spectrum to corresponding elements and/or isotopes which are in each case stored unambiguously in relation to a photon energy (by processing means including electronic processing means **18/20/22/24** and computer **26**; see col. 9, l. .13 – col. 10, l. 7).

On claim 14: Grenier et al teach a method for the non-destructive chemical analysis of test objects by means **4** of irradiating the test object with neutrons (neutron irradiation means 4; see abstract and col. 8, l. 41-46) and measuring the amount of gamma photon radiation emitted (by means of high resolution gamma detectors **14**; see col. 8, l. 59-63) promptly by the test object during the irradiation from the number of gamma photon quanta and respective photon energy in order to record a photon energy spectrum, characterized by

- determining characteristic photon energies from the amounts of gamma photon radiation from the entire photon energy spectrum which exceed background photon radiation, up to and including a photon energy of 12 MeV is concerned (col. 1, l. 33-43), and

- determining the elements and isotopes of the test object by assigning the characteristic photon energies distributed over the entire photon energy spectrum to corresponding elements and/or isotopes which are in each case stored unambiguously in relation to a photon energy (by processing means including electronic processing means **18/20/22/24** and computer **26**; see col. 9, l. .13 – col. 10, l. 7).

Grenier et al do not necessarily teach the limitation that said neutrons are generated from target-free fusion of concentrically accelerated deuterium ions. (Examiner note: although Grenier et al "prefer" 14 MeV neutrons, corresponding to the neutron energy from D-T fusion, said preference falls short of a teaching away from other fusion reaction produced neutrons, of which the easiest to achieve is the D-D fusion produced neutrons: a preferred embodiment does not constitute a teaching away (see MPEP 2123), section II).

However, it would have been obvious to include said limitation in view of Miley et al, who, in a patent on *inter alia* a D-D beam based fusion neutron source (see page 780, second column, second paragraph), hence analogous art, teaches a neutron source in the form of a concentric pair of electrodes (cathode and anode), wherein D-D reactions occur after concentric acceleration of deuterium ions, colliding in the center (see Figure 3 and page 780) (see abstract and col. 12, l. 15-33; and Figure 1).

Motivation to include the teaching by Miley et al into the invention by Grenier et al derives from the possibility to focus on fusion reaction produced neutron without the need for expensive management of a tritium inventory unlike D-T based production, nor

the need for a solid target. The focus on D-D reaction based neutron production clearly stands out as one of very few alternatives to D-T reaction based neutron production for those of ordinary skill in the art, especially in light of the thresholds for fusion reactions as a function of ionic charge (the Coulomb barrier has to be overcome).

The claim would have been obvious because a person of ordinary skill in the art has good reason to pursue the known options within his or her technical grasp; if this leads to the anticipated success, it is likely the result not of innovation but of ordinary skill and common sense.

On claim 15: the method by Grenier et al is further characterized by a quantitative determination of the chemical element composition of the test object by measuring the photon energy spectrum and determining the properties of the elements and isotopes determined by relating the amount of gamma photon radiation per element or isotope to the entire amount of photon radiation determined for all characteristic photon energies determined (col. 1, l. 56 – col. 2, l. 66; col. 9, l. 61- col. 10, l. 22 and col. 11, l. 54- col. 12, l. 34).

On claim 16: the amount of gamma radiation is, in the method by Grenier et al, obtained from the gamma radiation as measured (loc.cit.), which inherently determines the integrated accumulations, i.e., the areas of the characteristic curves in the regions of the characteristic photon energies, because any instrument counts an event not based on absolute certainty of wavelength but based on being in a bin defined by lower and upper limit.

On claim 17: the method is further characterized by recording a base photon energy spectrum of the test chamber without the test object and calculating a photon energy spectrum used for determining the elements and isotopes as claimed, as what is commonly known and trivially included in any serious measuring technique (to which examiner takes official notice) as a benchmark or null experiment (see col. 12, l. 3-11).

On claim 18: the method by Grenier et al is further characterized by comprising irradiating sections of the test object from a plurality of directions and evaluating the plurality of measurement results (col. 8, l. 47 – col. 9, l. 2: because measurements are taken during an extended period of time during which the test item travels on a conveyor belt).

Response to Arguments

Applicant's amendments have overcome the claim objection and all claim rejections under 35 USC 112, second paragraph.

Counter to applicant's arguments on rejections based on prior art (pages 9-10) in Grenier irradiation with 14 MeV neutrons is not a "principle", but instead only a preferred embodiment (see col. 3, l. 65-68). Admitted advantages have to be weighed against the considerable disadvantage of the requisite tritium handling (tritium is a radioactive isotope). Applicant is reminded that a preferred embodiment does not constitute a teaching away from the invention. See MPEP 2123, section II.

However, examiner admits error in the statement on D-D neutrons being in the 14 MeV range. Salisbury does not specifically teach D-D produced neutrons either. Accordingly, new art is cited (Miley et al) to supplement Grenier. With the teaching of

Miley et al the energy range of the neutrons is the same as from applicant's and hence arguments on the energy spectrum of the photons are moot in light of the new rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johannes P. Mondt whose telephone number is 571-272-1919. The examiner can normally be reached on 8:00 - 18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JPM
November 22, 2007

Primary Examiner:
Johannes Mondt (Art Unit: 3663)